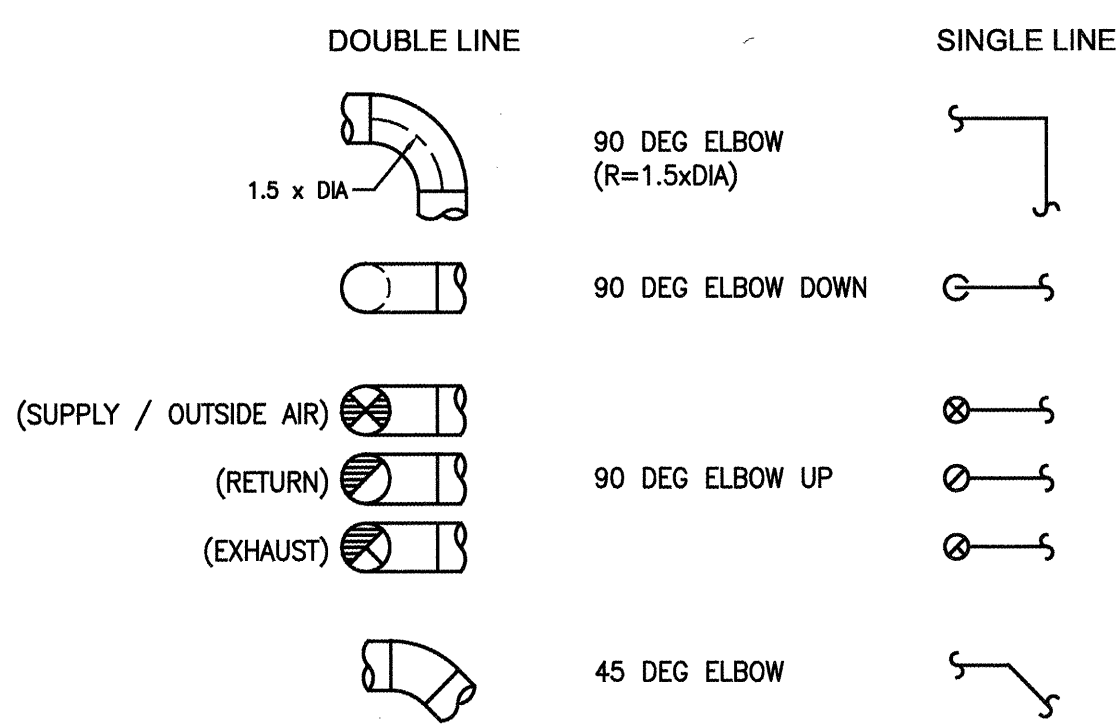


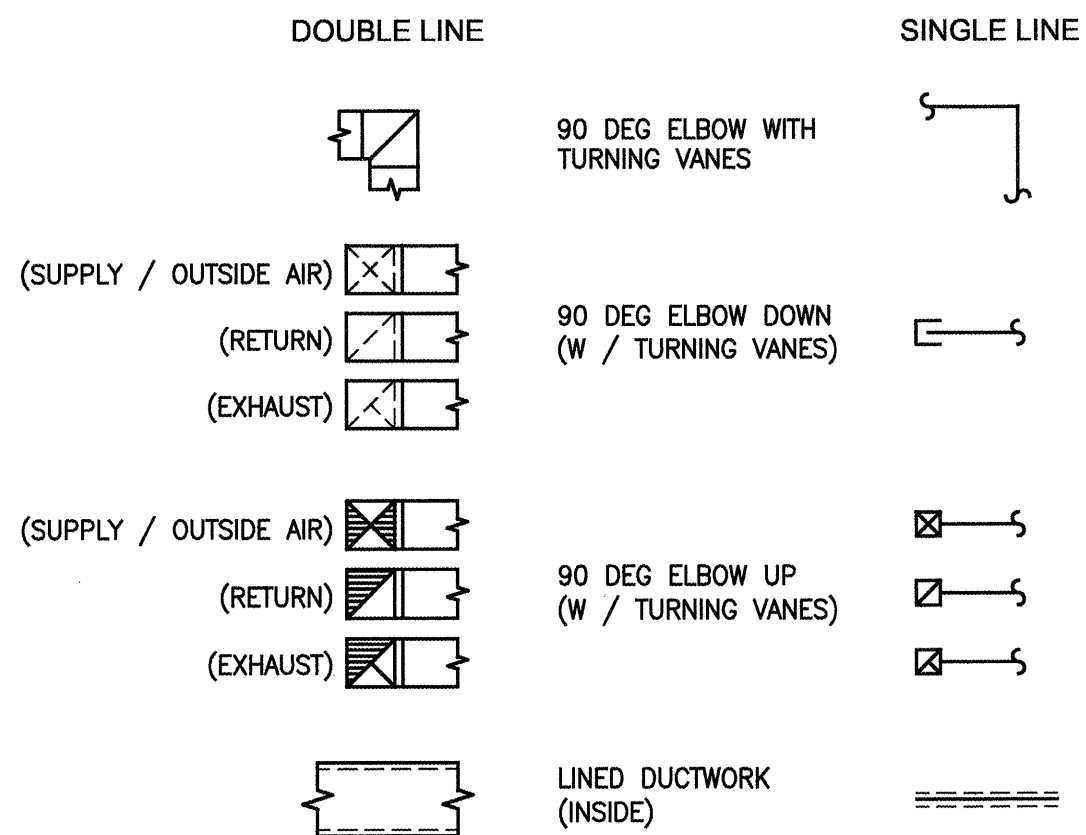
ABBREVIATIONS

AAV	AUTOMATIC AIR VENT
AFF	ABOVE FINISHED FLOOR
AC	AIR CONDITIONING UNIT
AD	ACCESS DOOR
AL	ACOUSTICAL DUCT LINING
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
ARCH	ARCHITECT / ARCHITECTURAL
AS	AIR SEPARATOR
BA	BALL VALVE
BDD	BACKDRAFT DAMPER
BHP	BRAKE HORSEPOWER
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
CC	COOLING COIL
CD	CONDENSATE DRAIN
CF	CHEMICAL FEEDER
CFM	CUBIC FEET PER MINUTE
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CKT	CIRCUIT
CONN	CONNECTION
CONT	CONTINUATION
CP	CONDENSATE PUMP
CTR	COOLING TOWER WATER RETURN
CTS	COOLING TOWER WATER SUPPLY
CU	CONDENSING UNIT
CW	DOMESTIC COLD WATER, CITY WATER
(D)	DEMOLITION
D	DRAIN
DB	DRYBULB
DEG	DEGREES
DF	DUCT FURNACE
DIA	DIAMETER
DN	DOWN
DWG	DRAWING
(E)	EXISTING
ET	EXPANSION TANK
EAT	ENTERING AIR TEMPERATURE
EA	EXHAUST AIR
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EFF	EFFICIENCY
EWI	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EXT	EXTERNAL
(F)	FUTURE
F	FURNACE
FA	FROM ABOVE
FB	FROM BELOW
FD	FIRE DAMPER
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FSD	FIRE SMOKE DAMPER
FT	FEET
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
HC	HEATING COIL
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
HP	HORSEPOWER
HU	HUMIDIFIER
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING
HW	DOMESTIC HOT WATER
HX	HEAT EXCHANGER
IH	INTAKE HOOD
IN	INCHES
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MANUF	MANUFACTURER
MAX	MAXIMUM
MECH	MECHANICAL CONTRACTOR
MIN	MINIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MUA	MAKEUP AIR
(N)	NEW
NC	NORMALLY CLOSED
NO	NUMBER/NORMALLY OPEN
OSA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OBD	OPPOSED BLADE DAMPER
OD	OVERFLOW DRAIN
PG	PROPANE GAS
PMP	PUMP
PSIG	POUNDS PER SQUARE INCH, GAUGE
QUAN	QUANTITY
R	RADIUS
RA	RETURN AIR
RAT	RETURN AIR TEMPERATURE
RD	ROOF DRAIN
(R)	RELOCATE
RF	RETURN FAN
RH	RELIEF HOOD
RHC	REHEAT COIL
RL	REFRIGERANT LIQUID PIPING
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION PIPING
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SF	SUPPLY FAN
ST	SOUND TRAP
SZ	SIZE
TEMP	TEMPERATURE
TYP	TYPICAL
V/P/H	VOLTS, PHASE, HERTZ
WB	WETBULB
WC	WATER COLUMN
WPD	WATER PRESSURE DROP

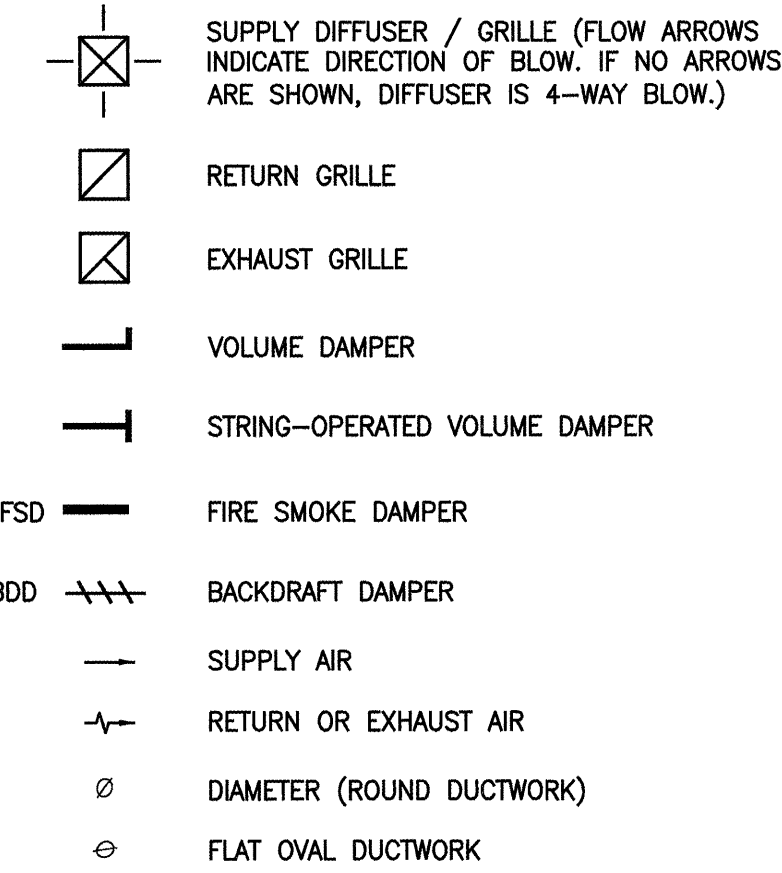
ROUND DUCTWORK



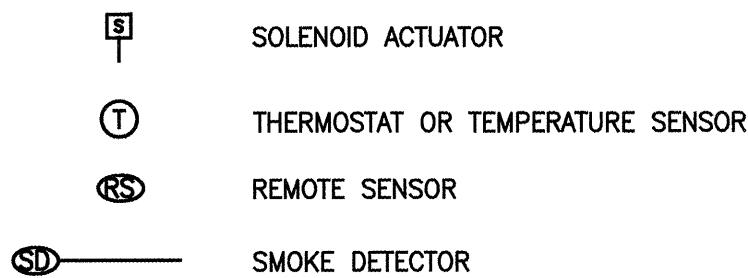
RECTANGULAR DUCTWORK



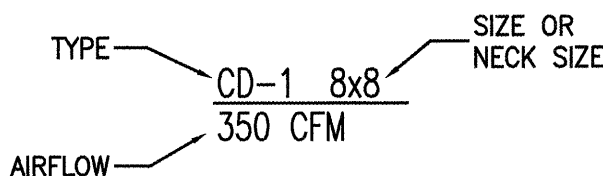
MISC DUCTWORK SYMBOLS



MISCELLANEOUS CONTROLS



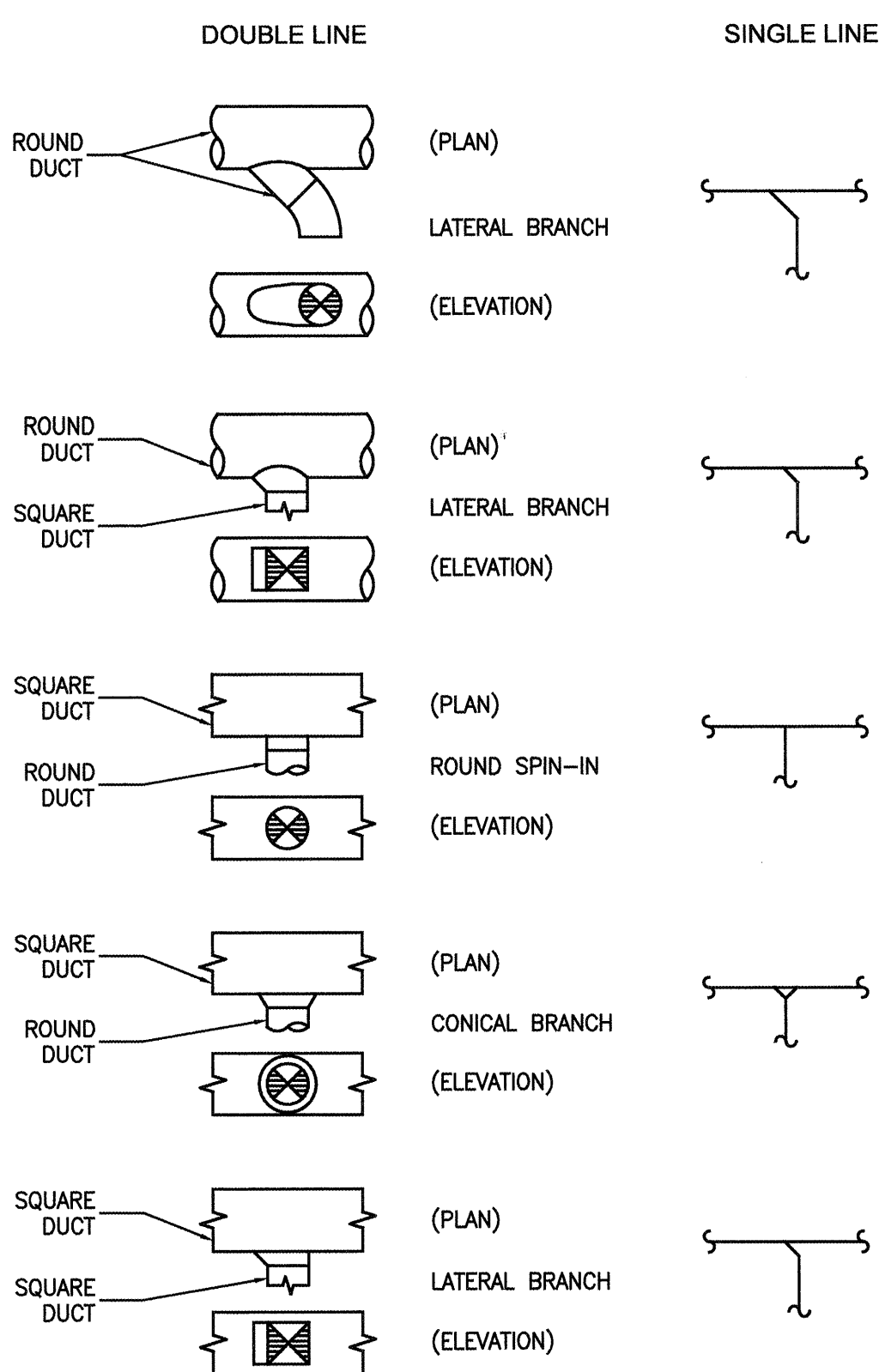
DIFFUSER / GRILLE CALLOUT



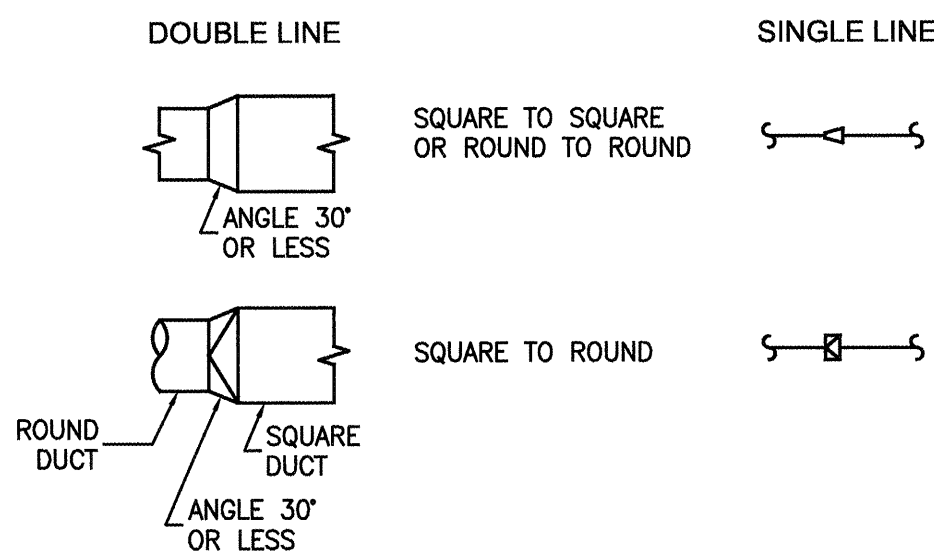
EQUIPMENT CALLOUT



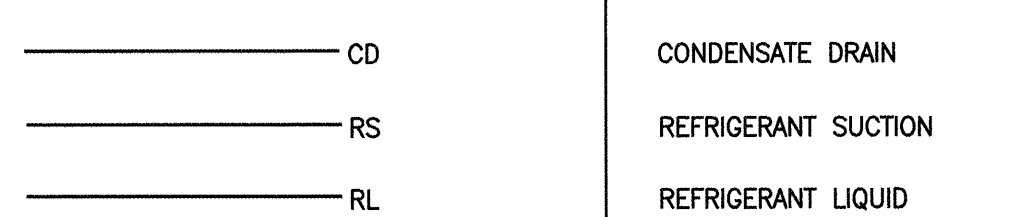
DUCTWORK TAKEOFFS



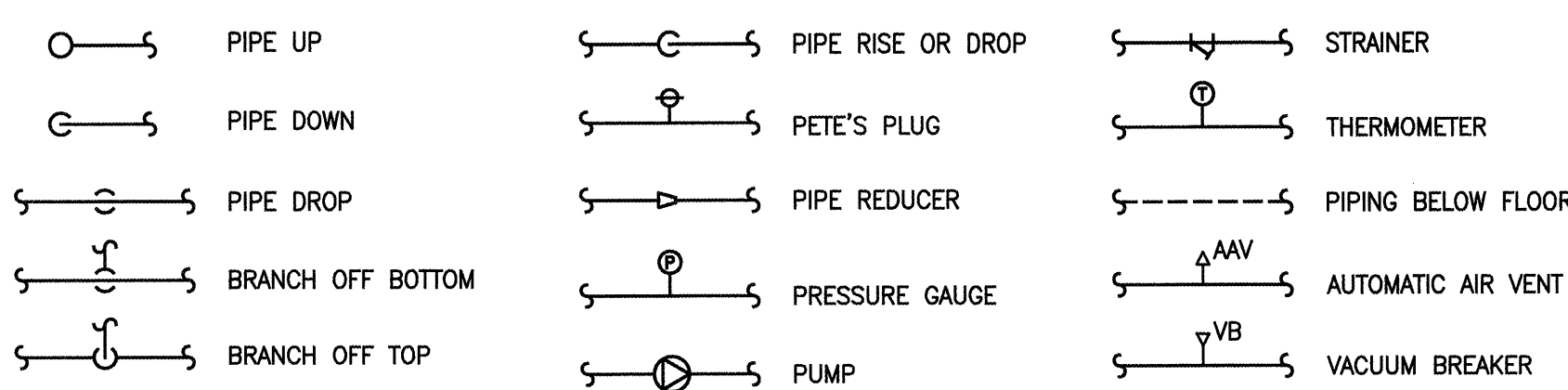
DUCTWORK TRANSITIONS



MECHANICAL PIPING LEGEND



MISC PIPING SYMBOLS



GENERAL NOTES

- THESE DRAWINGS ARE DIAGRAMMATIC; THEY DO NOT SHOW EVERY OFFSET, BEND, TEE, OR ELBOW WHICH MAY BE REQUIRED TO INSTALL WORK IN THE SPACE PROVIDED AND AVOID CONFLICTS. THE CONTRACTOR SHALL FOLLOW THE DRAWINGS AS CLOSELY AS IS PRACTICAL TO DO SO AND INSTALL ADDITIONAL BENDS, OFFSETS, TEES, AND ELBOWS WHERE REQUIRED BY LOCAL CONDITIONS FROM MEASUREMENTS TAKEN AT THE SITE, SUBJECT TO APPROVAL, AND WITHOUT ADDITIONAL COST TO THE OWNER.
- MECHANICAL SYSTEMS AND MATERIALS SHALL BE IN ACCORDANCE WITH THE FOLLOWING CODES:
  - 2006 IBC WITH OREGON AMENDMENTS
  - 2006 IMC WITH OREGON AMENDMENTS
  - 2003 UPC WITH OREGON AMENDMENTS
- PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH MASON INDUSTRIES "SEISMIC RESTRAINT GUIDELINES" FOR GENERAL HVAC DUCTWORK AS FOLLOWS:
  - ROUND DUCTWORK 26" DIA OR LARGER.
  - RECTANGULAR DUCTWORK WITH CROSS-SECTIONAL AREA EXCEEDING 6 SQUARE FEET.
  - PROVIDE SEISMIC RESTRAINTS FOR ALL DUCTWORK CONVEYING HAZARDOUS FUMES OR MATERIALS.
- PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH MASON INDUSTRIES "SEISMIC RESTRAINT GUIDELINES" FOR PIPING AS FOLLOWS:
  - DUCTILE PIPING 2-1/2" AND LARGER.
  - ALL NON-DUCTILE PIPING (THREADED IRON, PLASTIC, ETC.).
  - DUCTILE PIPING 1" AND LARGER CONVEYING FUEL GAS.
  - PIPE RACKS WHERE THE CUMULATIVE WEIGHT OF THE PIPING EXCEEDS 10 LBS PER LINEAL FOOT.
- SEISMICALLY RESTRAIN EQUIPMENT IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS FOR SEISMIC IMPORTANCE FACTOR 1.0.
- INSTALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- PROVIDE DUCT ACCESS DOORS AT ALL FIRE DAMPERS AND FIRE/SMOKE DAMPERS.
- DUCTWORK SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH SMACNA. 1-INCH PRESSURE CLASS FOR SUPPLY DUCTWORK, 1-INCH FOR RETURN DUCTWORK AND EXHAUST DUCTWORK. SEAL HVAC DUCTWORK SEAMS IN ACCORDANCE WITH SMACNA SEAL CLASS C.
- DUCTWORK DIMENSIONS CALLED OUT ARE NET INSIDE DIMENSIONS.
- PROVIDE FIRE SEALANT AT PENETRATIONS OF FIRE RATED ASSEMBLIES; COORDINATE REQUIREMENTS (E.G., F&T RATING, ASSEMBLY DETAILS) WITH ARCHITECT AND GENERAL CONTRACTOR.
- CONTRACTOR SHALL VERIFY THAT ALL EQUIPMENT, AS SHOWN ON THESE DRAWINGS, WILL NOT CONFLICT WITH ANY DRAINS, SCUTTLES, JOINTS, VENTS, ETC.
- ALL ROOF MOUNTED EQUIPMENT AND PENETRATIONS SHALL BE FLASHED A MINIMUM OF 6" ABOVE THE ROOF VIA ROOF CURBS AND PIPE SEALS. PROVIDE AMPLE SUPPLY TO ACCOMMODATE ELECTRICAL CONDUIT PENETRATIONS.
- ALL OUTSIDE AIR INTAKES SHALL BE A MINIMUM OF 10'-0" FROM ANY EXHAUST TERMINATION OR PLUMBING VENT.
- THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ADMINISTERING ALL WARRANTIES ON EQUIPMENT WHICH IT INSTALLS.
- THE MECHANICAL CONTRACTOR SHALL COORDINATE ALL DUCT AND DIFFUSER LOCATIONS WITH LIGHTING LAYOUTS.
- THE MECHANICAL CONTRACTOR SHALL COORDINATE WITH THE GENERAL CONTRACTOR AND OTHER TRADES, ALL REQUIRED OPENINGS AND EXCAVATIONS. ALL REQUIRED OPENINGS IN FOUNDATIONS, FLOORS, WALLS AND ROOFS SHALL BE DESIGNED INTO THE STRUCTURE INITIALLY BY THE USE OF SLEEVES, CURBS, ETC. CUTTING AND PATCHING SHALL BE HELD TO A MINIMUM.
- TRANSITION ALL DUCTS AS REQUIRED TO ATTACH AT EQUIPMENT CONNECTIONS.
- OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL COMPLY WITH SECTION 1317.4.3.3 OF THE OREGON STATE ENERGY CODE.

PIPING INSULATION

SERVICE	LOCATION	INSULATION CONDUCTIVITY (Btu/in)/(hr-ft-F)	MINIMUM INSULATION THICKNESS (IN) FOR NOMINAL PIPE DIAMETERS LISTED (IN)				
			RUNOUTS UP TO 2	1 AND LESS	1-1/4 TO 2	2-1/2 TO 4	5 AND 6
REFRIGERANT PIPING (RS)	ALL	0.23 - 0.27	0.5	0.5	0.75	1.0	1.0

- NOTES:
- RUNOUTS REFERENCED ABOVE NOT TO EXCEED 12 FEET IN LENGTH.
  - PIPE INSULATION TO INCLUDE ALL-PURPOSE FACTORY BONDED VAPOR BARRIER JACKET. PROVIDE INSULATION AND INSULATION COVERS (ZESTON 2000 OR EQUAL) FOR FITTINGS.

DUCT INSULATION

DUCT LOCATION	TYPE	MINIMUM INSULATION R-VALUE
ABOVE CEILING	SUPPLY	3.5
	OUTSIDE AIR	3.5
	RETURN	NONE, OR AS INDICATED ON DWGS
	EXHAUST	NONE, OR AS INDICATED ON DWGS
INSIDE CONDITIONED SPACE	SUPPLY	NONE, OR AS INDICATED ON DWGS
	OUTSIDE AIR	3.5
	RETURN	NONE, OR AS INDICATED ON DWGS
	EXHAUST	NONE, OR AS INDICATED ON DWGS



L R S

720 NW Davis  
Suite 300  
Portland, OR 97209  
Tel. 503.221.1121  
Fax. 503.221.2077

**munro & associates**  
consulting engineers

18678 SW Boones Ferry Rd  
Tualatin, Oregon 97062  
tel 503.612.6500  
fax 503.612.6588

CONSULTANTS

**TIGARD SENIOR CENTER  
RENOVATION AND ADDITION  
8815 SW O'WARA ST.  
TIGARD, OREGON 97223  
LEGEND & COVER SHEET  
HVAC**

PROJECT NAME

DATE: 09.20.07

CHECK: LD

DRAWN BY: RMT

PROJECT: 207037

MO

Michael, Plotted: Sep 19, 2007 - 4:18pm, M:\Projects\US Architects\1477-01 Tigard Senior Center\WorkingDrawings\1477-M1.x.dwg

FAN COIL UNITS																								
TAG NO.	ECONO-MIZER	SUPPLY AIR SCFM	MINIMUM OUTSIDE AIR SCFM	DESIGN BASIS		CONFIGURATION	SUPPLY FAN					DX COOLING SECTION				ELECTRIC HEATING SECTION				ELECTRICAL (2 CIRCUITS)			UNIT WEIGHT LBS	NOTES
							DRIVE TYPE	EXTERNAL STATIC		VFD	MOTOR HP	EAT DEG F DB	EAT DEG F WB	LAT DEG F DB	LAT DEG F WB	EAT DEG F	LAT DEG F	NUMBER OF STAGES	HEATER KW					
				SUPPLY IN W.C.	RETURN IN W.C.																			
				MANUF	MODEL			CARRIER	FE4ANB006											DIRECT	0.33	0.57		
FC1	NO	1,545	235			UPFLOW	DIRECT	0.33	0.57	NO	3/4	80.8	65.7	57.8	57.0	64.2	80.5	3	11.3	208/60/1	53.8/22.7	60/30	210	1-6

- NOTES:
1. VERIFY ELECTRICAL VOLTAGE PRIOR TO PLACING ORDER.
  2. FUSED DISCONNECT TO BE FURNISHED AND INSTALLED BY DIV 16.
  3. PROVIDE 24 HOUR/7 DAY PROGRAMMABLE THERMOSTAT CAPABLE OF PROVIDING A 5 DEG F DEADBAND BETWEEN HEATING AND COOLING SETPOINTS AND CAPABLE OF AUTOMATIC SETBACK OR SHUTDOWN DURING PERIODS OF NON-USE; THERMOSTAT SHALL BE INTELLIGENT HEAT CAPABLE.
  4. SEE HEAT PUMP CONDENSING UNIT SCHEDULE.
  5. PROVIDE FILTER HOUSING, 24x24 WITH 2" FILTER HEADER TRACK.
  6. PROVIDE FAN COIL UNIT MATCHED TO HEAT PUMP CONDENSER. PROVIDE ALL REQUIRED APURTENANCES FOR CORRECT OPERATION.

FANS													
TAG NO.	TYPE	AIR FLOW (CFM)	CONTROLLED BY	DESIGN BASIS		DRIVE TYPE	EXT STATIC (IN W.C.)	MOTOR			SONES AT 0.1" Ps	VOLTAGE	NOTES
				MANUF	MODEL			WATTS	AMPS	HP			
EF1	CEILING	150	Switched With Lights	GREENHECK	SP-A250	DIRECT	0.38	83	—	—	2.7	115/1	1-3
EF2	CEILING	150	Switched With Lights	GREENHECK	SP-A250	DIRECT	0.38	83	—	—	2.7	115/1	1-3
EF3	CEILING	75	Switched With Lights	GREENHECK	SP-B110	DIRECT	0.38	80	—	—	1.5	115/1	1-3
EF4	CEILING	50	Switched With Lights	GREENHECK	SP-B110	DIRECT	0.38	80	—	—	1.5	115/1	1-3

- NOTES:
1. VERIFY ELECTRICAL VOLTAGE PRIOR TO PLACING ORDER.
  2. PROVIDE INTEGRAL BACKDRAFT DAMPER.
  3. PROVIDE WITH EAVE ELBOW DISCHARGE ACCESSORY.

HEAT PUMP CONDENSING/EVAPORATING UNITS																	
TAG NO.	DESIGN BASIS		NOMINAL CAPACITY (BTUH)	COMPRESSOR TYPE	REFRIGERANT	COOLING AMBIENT TEMP (DEG F DB)	ELECTRICAL			UNIT WEIGHT (LBS)	MINIMUM EFFICIENCY					NOTES	INDOOR SECTION TAG NO.
	MANUF	MODEL					VOLTS/HZ/PHASE	MCA	MOCP		COOLING		HEATING				
											SEER	EER	HSPF	COP 47	COP 17		
HP1	CARRIER	25HNA6-48	48,000	2-STAGE RECIP	R-410A	90.0	208/60/1	30.4	50	360	16.30	11.80	9.3	2.72	2.22	1-3	FC1

- NOTES:
1. VERIFY ELECTRICAL VOLTAGE PRIOR TO PLACING ORDER.
  2. FUSED DISCONNECT WITH TIME-DELAY FUSE TO BE FURNISHED AND INSTALLED BY DIV 16.
  3. CONTROLS SHALL PREVENT ELECTRIC HEATER OPERATION WHEN THE HEATING LOAD CAN BE MET BY THE HEAT PUMP ALONE; CONTROLS SHALL MINIMIZE HEATER OPERATION DURING START-UP, SET-UP, AND DEFROST CONDITIONS; CONTROLS SHALL VISUALLY INDICATE WHEN HEATER IS OPERATING.

VENTILATION SCHEDULE for FC1															
ROOM NO.	NAME	COND AREA (SF)	OMSC 403.1 OCCUPIED AREA (SF)	OCCUPANCY FACTOR TABLE 403.3, OMSC (PEOPLE/1000 SF)	OCCUPANCY LOAD (PEOPLE)	VENTILATION AIR TABLE 403.3, OMSC		AVERAGE OCCUPANCY FACTOR, PARA. 403.3, OMSC	REQUIRED OSA (CFM)	ACTUAL DIRECT EXHAUST AIR (CFM)	SUPPLY AIR (CFM)	RETURN AIR (CFM)	PRESS.	REQUIRED OSA%	
													OUT (CFM)		
202	LIBRARY	485	317	20	6.3	15	CFM/PERSON	1.00	95	0	1220	1050	170	7.8%	
201	LOBBY/ENTRY	386	214	30	6.4	15	CFM/PERSON	1.00	96	0	325	275	50	29.6%	
TOTALS		871						191		—	1,545	1,325	220	29.6%	
COOLING ANALYSIS															
UNCORRECTED REQUIRED OSA PERCENTAGE OF COOLING SA = 12%															
ANALYSIS FOR MULTIPLE SPACES															
Y= X/(1+X-Z)															
CORRECTED OSA PERCENTAGE, Y= 15.0%															
ACTUAL UNIT OSA PERCENTAGE = 15.2%															
ACTUAL UNIT OSA CFM = 235															

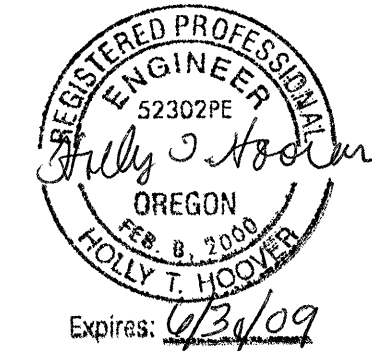
LOUVERS								
TAG NO.	TYPE	DESIGN BASIS		WIDTH (IN)	HEIGHT (IN)	VOLUMETRIC FLOW RATE (CFM)	FREE AREA (SF)	FREE AREA VELOCITY (FPM)
		MANUF	MODEL					
L-1	EXTRUDED ALUMINUM	GREENHECK	ESJ-202	20	10	275	0.36	760
L-2	EXTRUDED ALUMINUM	GREENHECK	ESJ-202	18	14	235	0.47	500
								NOTES
								1, 2
								1, 2

- NOTES:
1. LOUVER SHALL HAVE MAXIMUM 0.1 INCH W.C. AIR PRESSURE DROP AT 795 FPM FREE AREA VELOCITY.
  2. LOUVER SHALL HAVE BEGINNING POINT OF WATER PENETRATION AT 668 FPM FREE AREA VELOCITY.

DIFFUSERS, GRILLES, AND REGISTERS							
TAG NO.	TYPE	DESIGN BASIS		FRAME	DAMPER	REMARKS	NOTES
		MANUF	MODEL				
TG1	RECTANGULAR TRANSFER GRILLE	TITUS	350RL	SURFACE	YES	38 DEG DEFLECTION, 1/2" BLADE SPACING, WHITE FINISH	
HS1	HIGH SIDEWALL SUPPLY REGISTER	TITUS	300RS	SURFACE	YES	DOUBLE DEFLECTION, 3/4" BLADE SPACING WHITE FINISH	
LR1	LOW WALL RETURN GRILLE	TITUS	33RL	SURFACE	NO	38 DEG DEFLECTION, 1/2" BLADE SPACING WHITE FINISH, 16 GA BORDER, 14 GA BLADES	

ELECTRIC HEATERS								
TAG NO.	TYPE	CAPACITY KW	CONTROLLED BY	DESIGN BASIS		ELECTRICAL		NOTES
				MANUF	MODEL	VOLTAGE	FLA	
EW1-1	ELECTRIC WALL HEATER	1.0	THERMOSTAT	QMARK	ECP1024	208/1/60	-	1, 2
EW1-2	ELECTRIC WALL HEATER	1.0	THERMOSTAT	QMARK	ECP1024	208/1/60	-	1, 2

- NOTES:
1. VERIFY ELECTRICAL VOLTAGE PRIOR TO PLACING ORDER.
  2. PROVIDE WALL-MOUNTED THERMOSTAT.



**L R S**  
ARCHITECTS INC.  
720 NW Davis  
Suite 300  
Portland, OR 97209  
Tel. 503.221.1121  
Fax. 503.221.2077

**m&a**  
Munro & Associates  
consulting engineers  
18678 SW Boones Ferry Rd  
Tualatin, Oregon 97062  
tel 503.612.6500  
fax 503.612.6588

CONSULTANTS

TIGARD SENIOR CENTER  
RENOVATION AND ADDITION  
8815 SW O'MARA ST.  
TIGARD, OREGON 97223  
SCHEDULES  
HVAC

PROJECT NAME

DATE: 09.20.07

CHECK: LD  
DRAWN BY: RMT

PROJECT: 207037

M1.0

Copyright © 2008 LRS Architects, Inc.





GENERAL NOTES

- A. REFER TO MECHANICAL GENERAL NOTES ON DRAWING MO.  
B. ALL OUTSIDE AIR INTAKES SHALL BE A MINIMUM OF 10'-0" FROM ANY EXHAUST OR PLUMBING VENT.  
C. PROVIDE INTERNAL DUCT LINER A MINIMUM OF 10 FEET UPSTREAM AND DOWNSTREAM OF A FAN, AND AS SHOWN ON DRAWINGS FOR SOUND ATTENUATION.  
D. DUCT DIMENSIONS SHOWN ARE NET INSIDE DIMENSIONS.  
E. PROVIDE MANUAL BALANCING DAMPERS IN ALL FINAL BRANCH DUCTS SERVING INLETS AND OUTLETS, AND AS REQUIRED FOR FULL SYSTEM AIR BALANCING; INSTALL MANUAL BALANCING DAMPERS AS FAR FROM INLET OR OUTLET AS PRACTICAL.

720 NW Davis  
Suite 300  
Portland, OR 97209  
Tel. 503.221.1121  
Fax. 503.221.2077

**Munro & Associates**  
consulting engineers

18678 SW Boones Ferry Rd  
Tualatin, Oregon 97062  
tel 503.612.6500  
fax 503.612.6588

CONSULTANTS

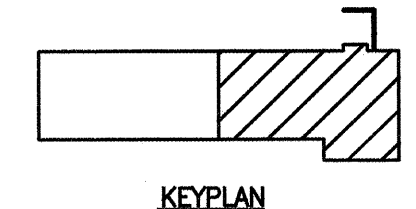
**TIGARD SENIOR CENTER  
RENOVATION AND ADDITION**  
8815 SW OMARA ST.  
TIGARD, OREGON 97223  
**HVAC PLAN  
LOWER LEVEL - EAST**

PROJECT NAME

DATE: 09.20.07

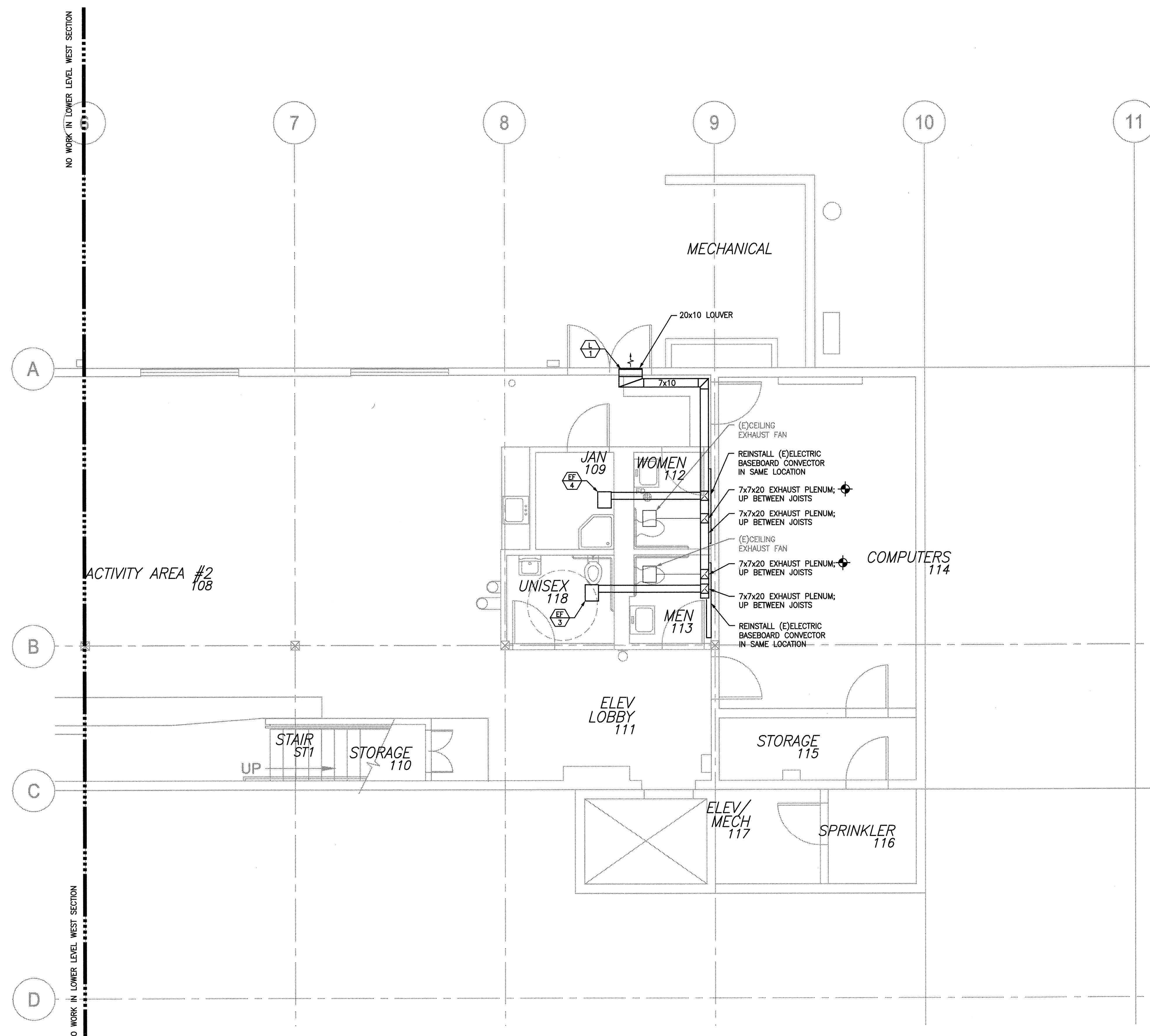
CHECK: LD  
DRAWN BY: RMT

PROJECT: 207037



**M2.0b**

Copyright © 2005 LRS Architects, Inc.

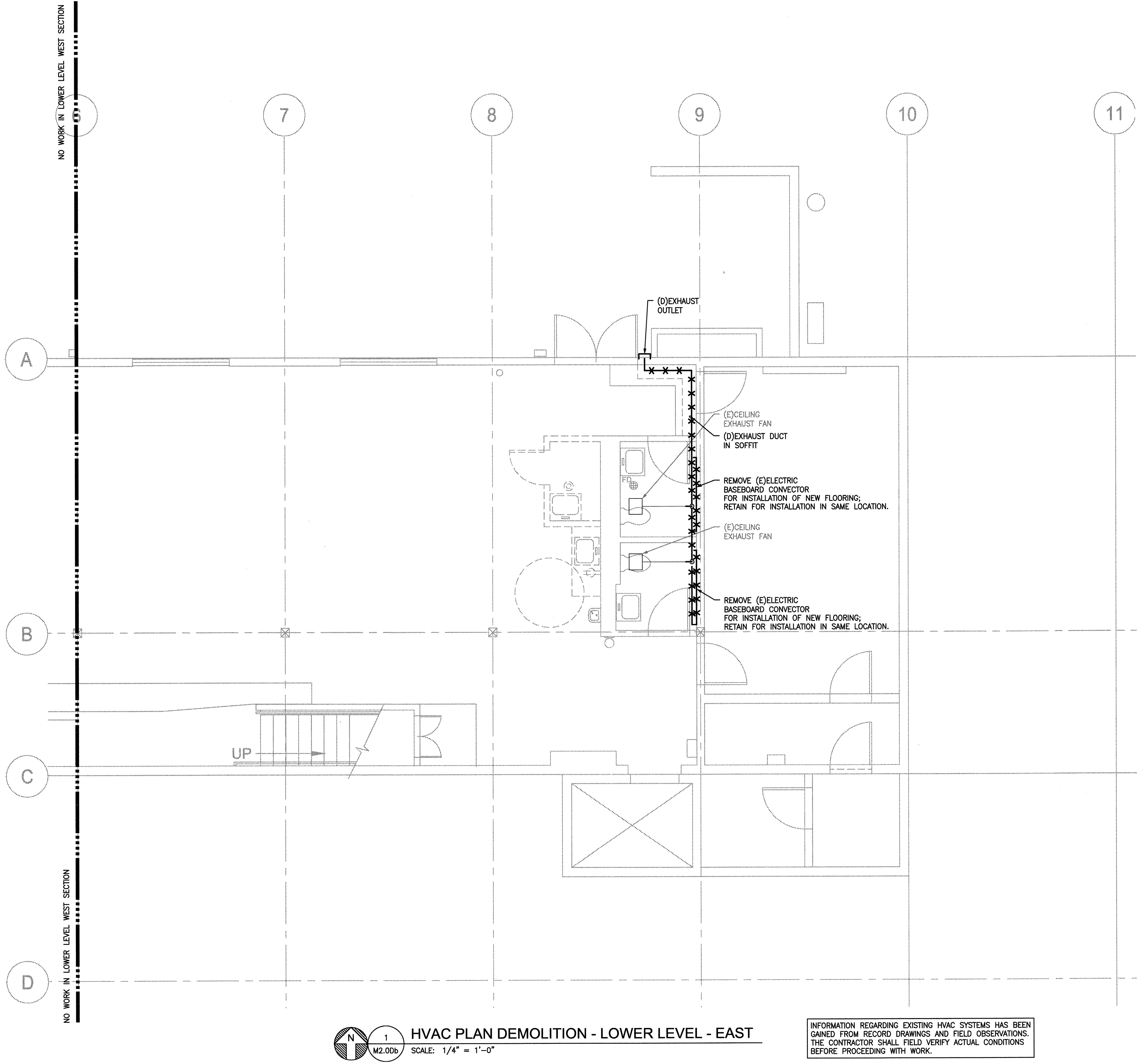


**HVAC PLAN - LOWER LEVEL - EAST**  
SCALE: 1/4" = 1'-0"

INFORMATION REGARDING EXISTING HVAC SYSTEMS HAS BEEN GAINED FROM RECORD DRAWINGS AND FIELD OBSERVATIONS. THE CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS BEFORE PROCEEDING WITH WORK.

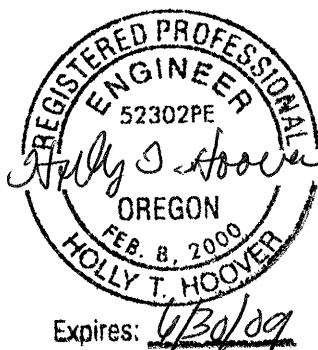
1/4"=1'-0" 2' 0 5' 10'

Michael, Plotted: Sep 19, 2007 - 4:18pm, M:\Projects\US Architects\1477-01 Tigard Senior Center\WorkingDrawings\1477-M2.0b.dwg



#### GENERAL NOTES

- REFER TO MECHANICAL GENERAL NOTES ON DRAWING M0.
- ALL OUTSIDE AIR INTAKES SHALL BE A MINIMUM OF 10'-0" FROM ANY EXHAUST OR PLUMBING VENT.
- PROVIDE INTERNAL DUCT LINER A MINIMUM OF 10 FEET UPSTREAM AND DOWNSTREAM OF A FAN, AND AS SHOWN ON DRAWINGS FOR SOUND ATTENUATION.
- DUCT DIMENSIONS SHOWN ARE NET INSIDE DIMENSIONS.
- PROVIDE MANUAL BALANCING DAMPERS IN ALL FINAL BRANCH DUCTS SERVING INLETS AND OUTLETS, AND AS REQUIRED FOR FULL SYSTEM AIR BALANCING; INSTALL MANUAL BALANCING DAMPERS AS FAR FROM INLET OR OUTLET AS PRACTICAL.



720 NW Davis  
Suite 300  
Portland, OR 97209  
Tel. 503.221.1121  
Fax. 503.221.2077

**ma**  
Munro &  
Associates  
consulting  
engineers

18678 SW Boones Ferry Rd  
Tualatin, Oregon 97062  
tel 503.612.6500  
fax 503.612.6588

CONSULTANTS

**TIGARD SENIOR CENTER  
RENOVATION AND ADDITION  
8815 SW O'WARA ST.  
TIGARD, OREGON 97223  
HVAC PLAN - DEMOLITION  
LOWER LEVEL - EAST**

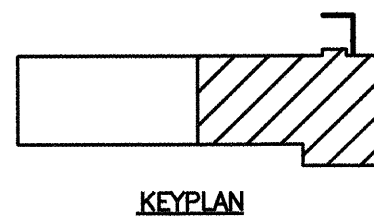
PROJECT NAME

DATE: 09.20.07

CHECK: LD

DRAWN BY: RMT

PROJECT: 207037

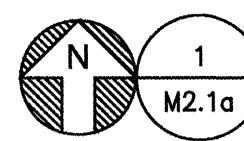
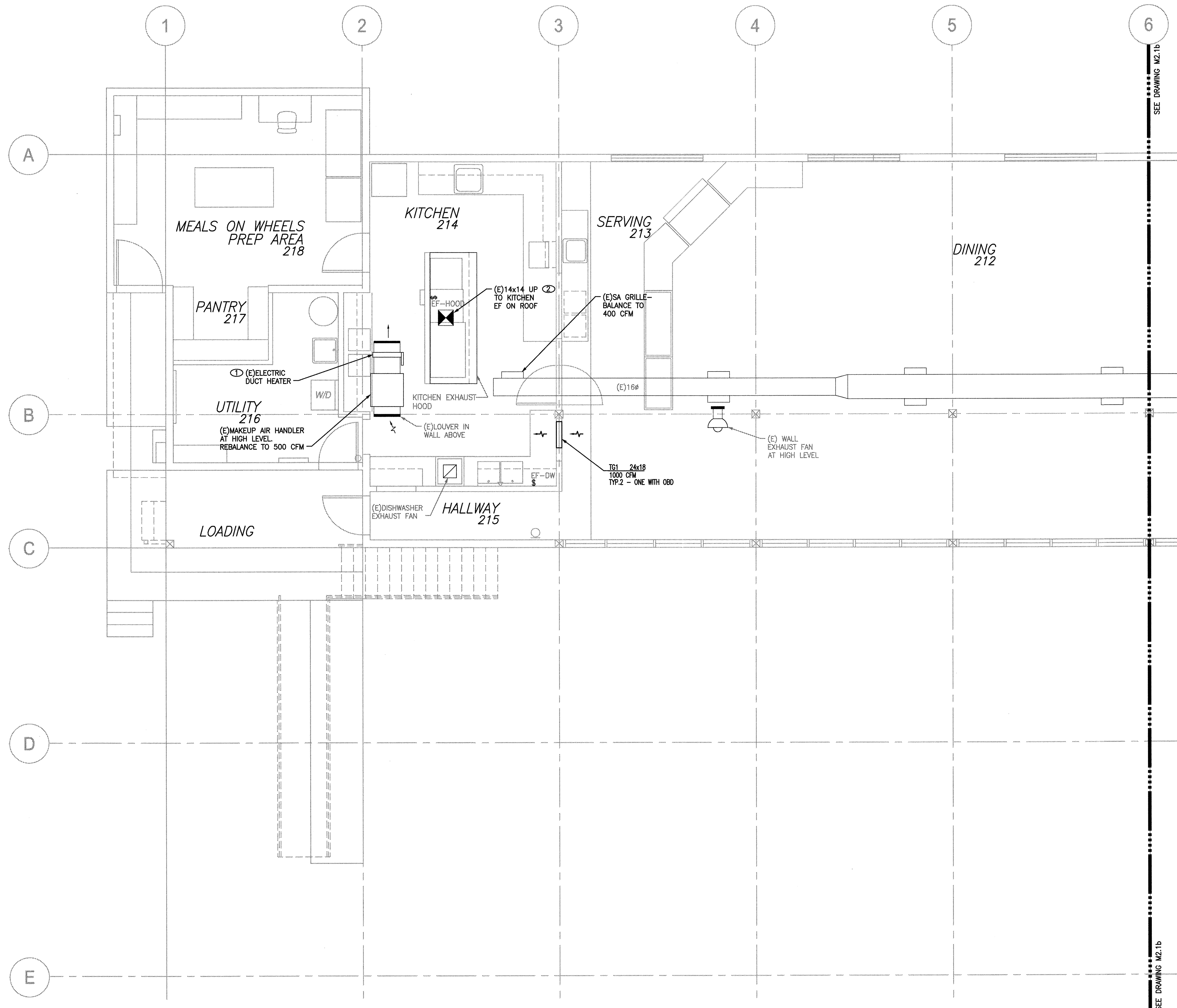


1/4"=1'-0" 2' 0 5' 10'

**M2.0Db**

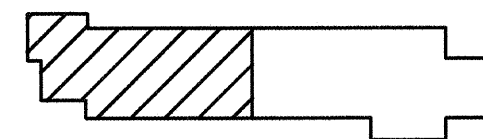
Copyright © 2008 LRS Architects, Inc.

M:\Projects\US Architects\1477-01 Tigard Senior Center\WorkingDrawings\1477-M2.1.dwg  
Michael, Plotted: Sep 19, 2007 - 4:18pm, M2.1a



HVAC PLAN - UPPER LEVEL - WEST  
SCALE: 1/4" = 1'-0"

INFORMATION REGARDING EXISTING HVAC SYSTEMS HAS BEEN GAINED FROM RECORD DRAWINGS AND FIELD OBSERVATIONS. THE CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS BEFORE PROCEEDING WITH WORK.



KEYPLAN

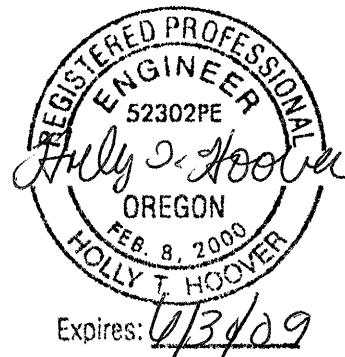
1/4"=1'-0" 2' 0 5' 10'

#### GENERAL NOTES

- REFER TO MECHANICAL GENERAL NOTES ON DRAWING M0.
- ALL OUTSIDE AIR INTAKES SHALL BE A MINIMUM OF 10'-0" FROM ANY EXHAUST OR PLUMBING VENT.
- PROVIDE INTERNAL DUCT LINER A MINIMUM OF 10 FEET UPSTREAM AND DOWNSTREAM OF A FAN, AND AS SHOWN ON DRAWINGS FOR SOUND ATTENUATION.
- DUCT DIMENSIONS SHOWN ARE NET INSIDE DIMENSIONS.
- PROVIDE MANUAL BALANCING DAMPERS IN ALL FINAL BRANCH DUCTS SERVING INLETS AND OUTLETS, AND AS REQUIRED FOR FULL SYSTEM AIR BALANCING; INSTALL MANUAL BALANCING DAMPERS AS FAR FROM INLET OR OUTLET AS PRACTICAL.

#### KEYED NOTES

- CONTRACTOR TO CONFIRM OPERATION OF (E) TEMPERATURE CONTROL OF (E) DUCT HEATER AND TO REPAIR (E) TEMPERATURE CONTROLLER TO MAINTAIN A 70 DEG F HEATER DISCHARGE TEMPERATURE.
- CONTRACTOR TO VERIFY UL762 LISTING OF KITCHEN HOOD EXHAUST FAN AND TO BALANCE FAN TO 1900 CFM.



720 NW Davis  
Suite 300  
Portland, OR 97209  
Tel. 503.221.1121  
Fax. 503.221.2077

**M&A**  
Munro &  
Associates  
consulting  
engineers

18678 SW Boones Ferry Rd  
Tualatin, Oregon 97062  
tel 503.612.6500  
fax 503.612.6588

CONSULTANTS

**TIGARD SENIOR CENTER  
RENOVATION AND ADDITION**  
8815 SW OMARA ST.  
TIGARD, OREGON 97223  
**HVAC PLAN  
UPPER LEVEL - WEST**

PROJECT NAME

DATE: 09.20.07

CHECK: LD

DRAWN BY: RMT

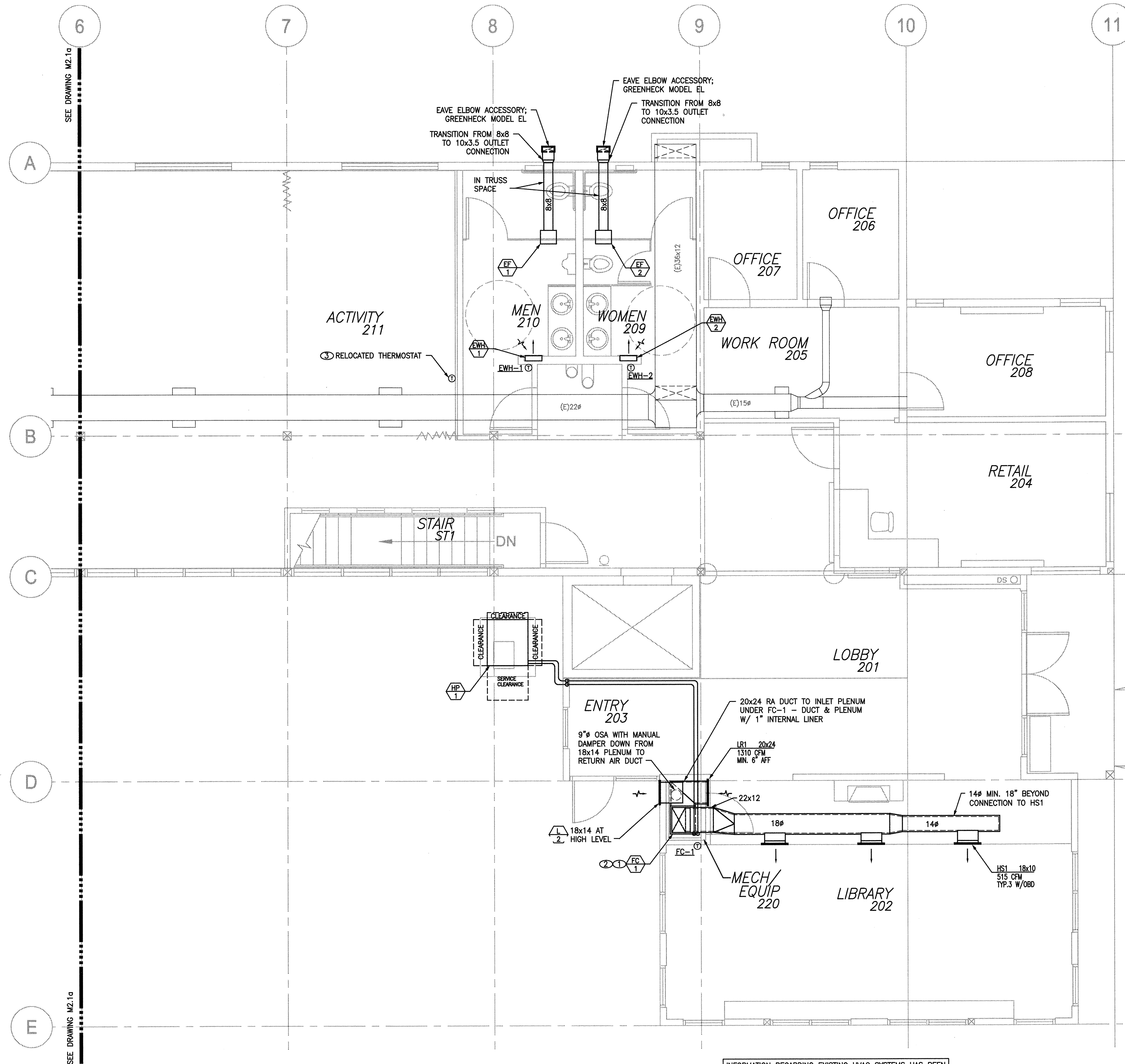
PROJECT: 207037

**M2.1a**

Copyright © 2008 LRS Architects, Inc.



Michael, Plotted: Sep 19, 2007 - 4:18pm, M:\Projects\US Architects\1477-01 Tigard Senior Center\WorkingDrawings\1477-M2.1.dwg



**HVAC PLAN - UPPER LEVEL - EAST**  
SCALE: 1/4" = 1'-0"

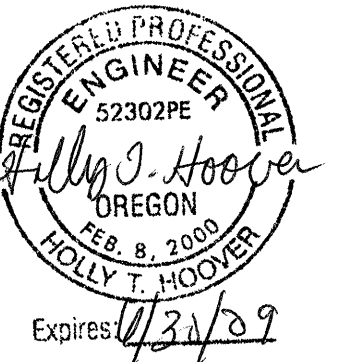
INFORMATION REGARDING EXISTING HVAC SYSTEMS HAS BEEN GAINED FROM RECORD DRAWINGS AND FIELD OBSERVATIONS. THE CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS BEFORE PROCEEDING WITH WORK.

#### GENERAL NOTES

- REFER TO MECHANICAL GENERAL NOTES ON DRAWING M0.
- ALL OUTSIDE AIR INTAKES SHALL BE A MINIMUM OF 10'-0" FROM ANY EXHAUST OR PLUMBING VENT.
- PROVIDE INTERNAL DUCT LINER A MINIMUM OF 10 FEET UPSTREAM AND DOWNSTREAM OF A FAN, AND AS SHOWN ON DRAWINGS FOR SOUND ATTENUATION.
- DUCT DIMENSIONS SHOWN ARE NET INSIDE DIMENSIONS.
- PROVIDE MANUAL BALANCING DAMPERS IN ALL FINAL BRANCH DUCTS SERVING INLETS AND OUTLETS, AND AS REQUIRED FOR FULL SYSTEM AIR BALANCING; INSTALL MANUAL BALANCING DAMPERS AS FAR FROM INLET OR OUTLET AS PRACTICAL.

#### KEYED NOTES

- PROVIDE FILTER HOUSING WITH SIDE ACCESS PANEL ON VERTICAL RISE TO FAN COIL. FILTER TO BE REMOVABLE FROM ARCHITECTURAL DOOR SIDE OF UNIT.
- EXTEND CONDENSATE THRU WEST WALL AT LOW LEVEL NEAR GRADE AND TERMINATE OVER LANDSCAPING STRIP.
- PULL NEW CONTROL WIRING FROM (E) HVAC EQUIPMENT TO (R) THERMOSTAT LOCATION.



**L R S**

720 NW Davis  
Suite 300  
Portland, OR 97209  
Tel. 503.221.1121  
Fax. 503.221.2077

**m&a**

**Munro & Associates**  
consulting  
engineers  
18678 SW Boones Ferry Rd  
Tualatin, Oregon 97062  
tel 503.612.6500  
fax 503.612.6588

CONSULTANTS

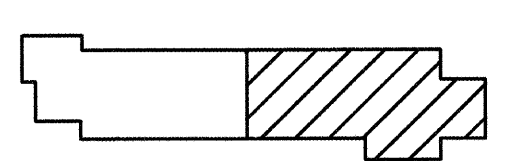
**TIGARD SENIOR CENTER  
RENOVATION AND ADDITION  
8815 SW OMARA ST.  
TIGARD, OREGON 97223  
HVAC PLAN  
UPPER LEVEL - EAST**

PROJECT NAME

DATE: 09.20.07

CHECK: LD  
DRAWN BY: RMT

PROJECT: 207037

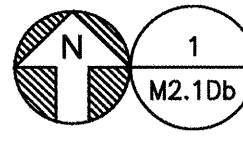
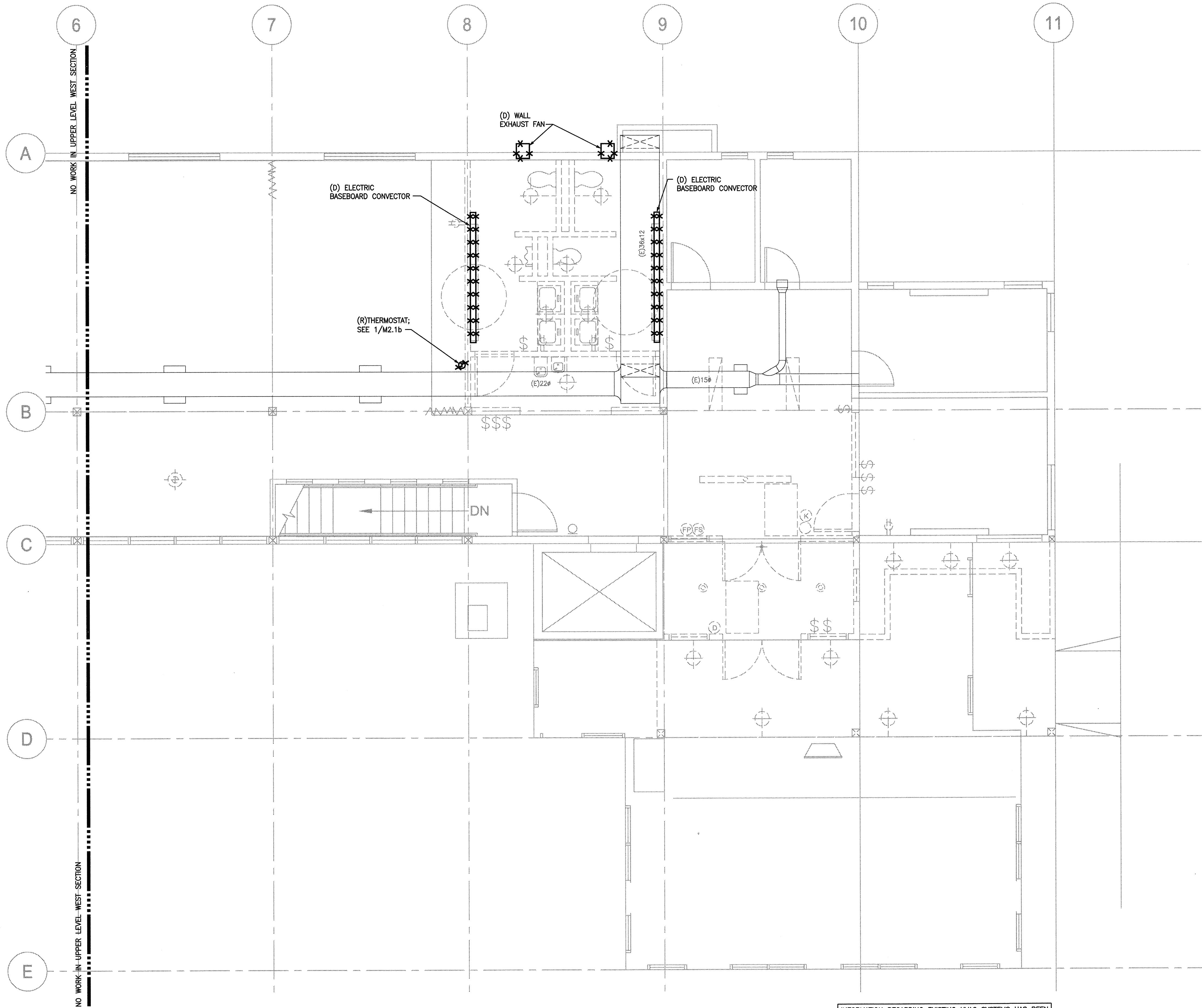


KEYPLAN

1/4"=1'-0" 2' 0 5' 10'

**M2.1b**

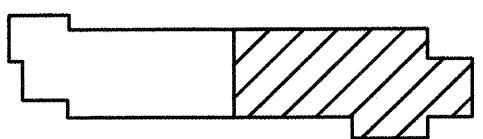
Copyright © 2008 LRS Architects, Inc.



HVAC PLAN - DEMOLITION - UPPER LEVEL - EAST

SCALE: 1/4" = 1'-0"

INFORMATION REGARDING EXISTING HVAC SYSTEMS HAS BEEN GAINED FROM RECORD DRAWINGS AND FIELD OBSERVATIONS. THE CONTRACTOR SHALL FIELD VERIFY ACTUAL CONDITIONS BEFORE PROCEEDING WITH WORK.



KEYPLAN

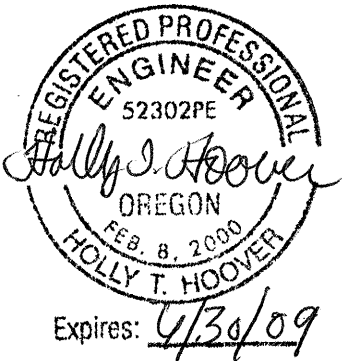
1/4"=1'-0" 2' 0 5' 10'

GENERAL NOTES

- REFER TO MECHANICAL GENERAL NOTES ON DRAWING M0.
- ALL OUTSIDE AIR INTAKES SHALL BE A MINIMUM OF 10'-0" FROM ANY EXHAUST OR PLUMBING VENT.
- PROVIDE INTERNAL DUCT LINER A MINIMUM OF 10 FEET UPSTREAM AND DOWNSTREAM OF A FAN, AND AS SHOWN ON DRAWINGS FOR SOUND ATTENUATION.
- DUCT DIMENSIONS SHOWN ARE NET INSIDE DIMENSIONS.
- PROVIDE MANUAL BALANCING DAMPERS IN ALL FINAL BRANCH DUCTS SERVING INLETS AND OUTLETS, AND AS REQUIRED FOR FULL SYSTEM AIR BALANCING; INSTALL MANUAL BALANCING DAMPERS AS FAR FROM INLET OR OUTLET AS PRACTICAL.

KEYED NOTES

○ N/A



L R S

720 NW Davis  
Suite 300  
Portland, OR 97209  
Tel. 503.221.1121  
Fax. 503.221.2077



**Munro & Associates**  
consulting  
engineers  
18678 SW Boones Ferry Rd  
Tualatin, Oregon 97062  
tel 503.612.6500  
fax 503.612.6588

CONSULTANTS

**TIGARD SENIOR CENTER  
RENOVATION AND ADDITION  
8815 SW O'WARA ST.  
TIGARD, OREGON 97223  
HVAC PLAN - DEMOLITION  
UPPER LEVEL - EAST**

PROJECT NAME

DATE: 09.20.07

CHECK: LD

DRAWN BY: RMT

PROJECT: 207037

M2.1Db